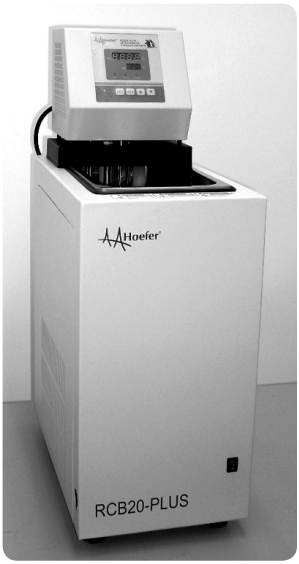
user manual

RCB20-PLUS
Refrigerated and Heated Circulation Bath

Operating Instructions



um RCB20-PLUS-IM/Rev.B0/11-12

Hoefer®

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Important Information – English

- If this equipment is used in a manner not specified by Hoefer, Inc. the protection provided by the equipment may be impaired.
- This instrument is designed for indoor laboratory use only.
- Only accessories and parts approved or supplied by Hoefer, Inc. may be used for operating, maintaining, and servicing this product.
- Warning! Because this instrument can develop sufficient voltage and current to produce a lethal shock, care must be exercised in its operation.
- This instrument is designed in accordance with the EN61010-1:2001 electrical safety standard. Nevertheless, it should be used only by properly trained operators. Read this entire manual before using the instrument and use only according to the instructions.
- The instrument must always be used with the earth lead of the power cord correctly grounded to earth at the mains outlet.
- Use only undamaged electrical wire and equipment specific for the voltages you will use. All equipment connected to high voltage should be in accordance with EN61010-1:2001.
- Keep the instrument as dry and clean as possible. Wipe regularly with a soft, damp cloth. Let the instrument dry completely before use.
- Do not operate the instrument in extreme humidity (above 80%). Avoid condensation by letting the unit equilibrate to ambient temperature when taking the instrument from a colder to a warmer environment.
- To permit sufficient cooling, ensure that the vents of the instrument are not covered.

Duležité Informace – Czech

- Pokud by toto zařízení je použito způsobem, který není podle Hoefer, ochrana poskytovaná na základě Inc. zařízení může být narušena.
- Tento nástroj je určen pro vnitřní použití v laboratoři pouze.
- Pouze příslušenství a části schválen, nebo poskytnutých Hoefer, Inc. mohou být použity pro provoz, údržbu, a údržbě tohoto výrobku.
- Pozor! Protože tento nástroj může vyvinout dostatečný napětí a proud, který má vyrábět a smrtiacej šok, péče musí být vykonávána v jeho provoz.
- Tento nástroj je určen v souladu s EN61010-1:2001 elektrické bezpečnostní normy. Přesto, že by měly být použity pouze řádně vyškolený operátorů. Číst celé toto ruční před použitím nástroje a použití pouze v souladu s pokyny.
- Přístroj musí být vždy používají se na výkonu zemi vést šňůra správně zemněny k zemi na síti výústce.
- Využití pouze nepoškozené elektrické dráty a vybavení pro napětí budete používat. Všechna zařízení spojené s vysokým napětím by měla být v souladu s EN61010-1:2001.
- Si ponechá nástroje jako suchý a čistý jako možné. Otřete pravidelně s a měkké, vlhkým hadříkem. Nechť je nástroj nenastavený úplně před použitím.
- Nejsou provozována na nástroj v extrémní vlhkost (nad 80%). Předešlo kondenzaci o pronájmu jednotky na okolní teplotu nechá při přijímání nástroj z chladnější do teplého prostředí.
- Pro umožnění dostatečné chlazení, zajistit, aby otvory nástroje jsou nevztahuje.

Vigtig Information – Danish

- Hvis dette udstyr bruges i en måde ikke specificeret ved Hoefer, Inc. den beskyttelse, som er blevet forsynet af udstyret kan måske svækkes.
- Dette instrument er designet for indendørs laboratoriumbrug bare.
- Bare tilbehør og del godkendede eller forsynede ved Hoefer, Inc. kan måske bruges for drive, funktionsfejl, og betjening dette produkt.
- Advare! Fordi dette instrument kan udvikle tilstrækkelig spænding og strøm at fremstille et dødbringende chok, skal pleje bruges i dets drift.
- Dette instrument er designet i overensstemmelse med EN61010-1:2001 elektrisk sikkerhedstandard. Alligevel, skulle det bruges bare af passende trænede operatører. Læs denne hel håndbog før bruging instrumentet og brug bare i henhold til instruktionerne.
- Instrumentet skal altid bruges med jordblyet af netledningen rigtigt jordede til jord på hovedledningsudløbet.
- Bruger bare uskadt elektrisk tråd og udstyr, som være specifik for spændingerne du vil bruge. Alt udstyr forbundet til høj spænding skulle være i overensstemmelse med EN61010-1:2001.
- Beholder instrumentet så tør og ren som mulig. Tør regulært med et blødt, fugtigt stof. Lad instrumenttørken komplet før brug.
- Driver ikke instrumentet i yderst fugtighed (ovenfor 80%). Undgå kondensation ved lade enheden equilibrate til omgivende temperatur ved tageen instru-

mentets fra et koldere til et varmere miljø.

- At tillade tilstrækkelig afkøling, forsikrer, at lufthullerne af instrumentet er ikke dækket.

Belangrijke Informatie – Dutch

- Indien deze uitrusting in een manier wordt gebruikt die niet door Hoefer is gespecificeerd, Nv. de bescherming die door de uitrusting is verzorgd kan worden geschaad.
- Dit instrument is voor binnenlaboratoriumgebruik enkel ontworpen.
- Enkel onderdelen en delen keurden goed of leverden door Hoefer, Nv. kan voor het bedienen worden gebruikt, handhavend en onderhouden van dit product.
- Waarschuwend! Omdat dit instrument voldoende spanning en stroom kan ontwikkelen om een dodelijke schok te produceren, moet zorg in zijn operatie worden geoefend.
- Dit instrument is in overeenstemming met de EN61010-1:2001 elektrische veiligheidsstandaard ontworpen. Niettemin zou het enkel door goed getrainde bedieningslieden moeten worden gebruikt. Lees dit volledige handboek voor het gebruik het instrument en gebruik enkel volgens de instructies.
- Het instrument moet altijd met de aardeleiding van het stroomsnoer correct grondde naar aarde aan het hoofdafzetgebied worden gebruikt.
- Gebruik enkel onbeschadigde elektrische draad en uitrustings specifiek voor de spanningen u zult gebruiken. Alle uitrustingen sloten aan aan hoogspanning zou in overeenstemming met EN61010-1:2001 moeten zijn.
- Houd het instrument zo droge en schone zoals mogelijk Bij. Wis regelmatig met een zacht, temper doek. Verhuur het instrument droogt volledig voor het gebruik.
- Bedien niet het instrument in extreme vochtigheid (bovenstaande 80%). Vermijd condensatie door het verhuren van de eenheid in evenwicht brengt naar omgevingstemperatuur wanneer nemen het instrument van een kouder naar een lievere omgeving.
- Om toe te staan voldoende afkoelen, verzeker dat de luchtopeningen van het instrument niet bedekt zijn.

Tärkeää Tietoa – Finnish

- Jos tätä varusteita käytetään tavassa ei määritetty Hoeferille, Inc. suojelu ehkäisty varusteille saattaa olla avuton.
- Tämä väline suunnitellaan sisälaboratoriokäytölle vain.
- Vain lisävarusteet ja osat hyväksyivät tai toimitti Hoeferin oheen, Inc.:ää voi käyttää käyttämiselle, valvoalle, ja servicing tämä tuote.
- Varoittaminen! Koska tämä väline voi kehittää riittävä jännitteen ja virran tuottaa kuolettavan järkytyksen, huolta täytyy harjoittaa toiminnossaan.
- Tämä väline suunnitellaan EN61010-1:2001 sähköturvallisuusstandardin mukaisesti. Silti pitäisi käyttää vain ohi oikeasti koulutetut käyttäjät. Lue tämä kokonainen manuaalinen ennen välinettä ja käyttö vain ohjeiden mukaan.
- Välinettä täytyy käyttää aina valtanuoran maalyijystä perusti oikein maadoittaa sähköverkkoaukossa.
- Käyttää vain undamaged sähkömetallilankaa ja varusteita, täsmällinen jännitteille käyttää. Kaikki varusteet yhdistetty korkeaan jännitteeseen pitäisi olla EN61010-1:2001IN mukaisesti.
- Pitää välineen yhtä kuiva ja puhdas kuin mahdollinen. Pyyhi säännöllisesti pehmeällä, kostealla kankaalla. Anna väline kuivua täysin ennen käyttöä.
- Ei käytä välinettä extreme-ilmankosteudessa (80%)n yläpuolella. Vältä tiivistymistä antamalla yksikön equilibrate ympäröivään lämpötilaan kun ottaminen väline kylmempi lämpimämpään ympäristöön.
- Sallia riittävän jäähdyttäminen, varmistaa että välineen ilmareiät peitetään.

Information Importante – French

- Si cet équipement est utilisé dans une manière pas spécifié par Hoefer, Inc. la protection fourni par l'équipement pourrait être diminuée.
- Cet instrument est conçu pour l'usage de laboratoire intérieur seulement.
- Seulement les accessoires et les parties ont approuvé ou ont fourni par Hoefer, Inc. pourrait être utilisé pour fonctionner, maintenir, et entretenir ce produit.
- Avertissant! Parce que cet instrument peut développer la tension et le courant suffisants pour produire un choc mortel, le soin doit être exercé dans son opération.
- Cet instrument est conformément conçu à l'EN61010-1:2001 norme de sécurité électrique. Néanmoins, il devrait être seulement utilisé par les opérateurs convenablement entraînés. Lire ce manuel entier avant utiliser l'instrument et l'usage seulement selon les instructions.
- L'instrument toujours doit être utilisé avec l'avance de terre du cordon d'alimentation correctement a fondé à

la terre à la sortie principale.

- Utiliser le fil et l'équipement électriques seulement intacts spécifiques pour les tensions que vous utiliserez. Tout équipement connecté à haute tension devrait être conformément à EN61010-1:2001.
- Garder l'instrument aussi sec et propre comme possible. Essuyer régulièrement avec un doux, étouffer du tissu. Laisser l'instrument sèche complètement avant l'usage.
- Ne pas fonctionner l'instrument dans l'extrême humidité (au-dessus de 80%). Eviter la condensation en laissant l'equilibrate d'unité à la température ambiante en prenant l'instrument d'un plus froid à un environnement plus chaud.
- Permettre le refroidissement suffisant, garantir que les conduits de l'instrument ne sont pas couverts.

Wichtige Informationen – German

- Wenn diese Ausrüstung gewissermaßen nicht angegeben durch Hoefer, Inc verwendet wird, kann der durch die Ausrüstung zur Verfügung gestellte Schutz verschlechtert werden.
- Dieses Instrument wird für den Innenlaborgebrauch nur dafür entworfen.
- Nur Zusätze und Teile genehmigten oder lieferten durch Hoefer, Inc kann für das Funktionieren, das Aufrechterhalten, und die Wartung dieses Produktes verwendet werden.
- Die Warnung! Weil dieses Instrument genügend Stromspannung und Strom entwickeln kann, um einen tödlichen Stoß zu erzeugen, muss Sorge in seiner Operation ausgeübt werden.
- Dieses Instrument wird in Übereinstimmung mit dem EN61010-1:2001 elektrischen Sicherheitsstandard dafür entworfen. Dennoch sollte es nur von richtig erzogenen Maschinenbedienern verwendet werden. Lesen Sie dieses komplette Handbuch vor dem Verwenden des Instrumentes und verwenden Sie nur gemäß den Instruktionen.
- Das Instrument muss immer mit der Erdleitung der Macht-Schnur richtig niedergelegt zur Erde am Hauptausgang verwendet werden.
- Nur unbeschädigte elektrische Leitung und Ausrüstung spezifisch für die Stromspannungen verwenden, die Sie verwenden werden. Die ganze mit der Hochspannung verbundene Ausrüstung sollte in Übereinstimmung mit EN61010-1:2001 sein.
- Das Instrument ebenso trocken halten und reinigen wie möglich. Wischen Sie regelmäßig mit einem weichen, befeuchten Sie Stoff. Lassen Sie das Instrument trocken völlig vor dem Gebrauch.
- Das Instrument in der äußersten Feuchtigkeit (über 80 %) nicht bedienen. Vermeiden Sie Kondensation, die Einheit equilibrate zur Umgebungstemperatur laßend, wenn Sie das Instrument von einem kälteren bis eine wärmere Umgebung nehmen.
- Um das genügend Abkühlen zu erlauben, stellen Sie sicher, dass die Öffnungen des Instrumentes nicht bedeckt werden.

Informazioni Importanti – Italiano

- Se quest'apparecchiatura è usata in un modo specificato da Hoefer, Inc. la protezione fornito dall'apparecchiatura potrebbe essere indebolita.
- Questo strumento è disegnato per l'uso di laboratorio interno solo.
- Solo gli accessori e le parti hanno approvato o hanno fornito da Hoefer, Inc. potrebbe essere usato per operare, per mantenere, e per revisionare questo prodotto.
- Avvertendo! Perché questo strumento può sviluppare il voltaggio sufficiente e la corrente di produrre una scossa letale, la cura deve essere esercitata nella sua operazione. Questo strumento è disegnato conformemente all'EN61010-1:2001 la norma di sicurezza elettrica. Tuttavia, dovrebbe essere usato degli operatori solo correttamente addestrati. Leggere questo manuale intero prima di usare lo strumento e l'uso solo secondo le istruzioni.
- Lo strumento deve essere sempre usato col piombo di terra della spina di alimentazione correttamente hanno messo a terra alla terra alla presa di corrente principale.
- Usa il filo metallico e l'apparecchiatura solo intatti elettrici specifici per i voltaggi che lei userà. Tutta l'apparecchiatura collegata all'alto voltaggio dovrebbe essere conformemente a EN61010-1:2001.
- Tiene lo strumento come secco e pulito come possibile. Pulire regolarmente con un morbido, per spegnere il panno. Lasciare lo strumento asciuga completamente prima dell'uso.
- Non opera lo strumento nell'umidità estrema (al di sopra di 80%). Evitare la condensazione lasciando l'unità equilibra alla temperatura ambiente quando portare lo strumento da un più freddo a un ambiente più caldo.
- Di permettere raffreddare sufficiente, assicura che gli sbocchi dello strumento non sono coperti.

Viktig Informasjon – Norwegian

- Hvis dette utstyret blir brukt i en måte ikke spesifisert ved Hoefer, Inc. beskyttelsen som ha blitt git av utstyret kan bli svekket.
- Dette instrumentet er utformet for innendørs laboratoriumbruk bare.
- Bare tilbehør og deler godkjente eller forsynte ved Hoefer, Inc. kan bli brukt for drive, vedlikeholde, og betjene dette produktet.
- Varsler ! Fordi dette instrumentet kan utvikle tilstrekkelig spenning og strøm til å produsere et dødelig sjokk, må bli øvd bekymring i dets drift.
- Dette instrumentet er utformet i samsvar med EN61010-1:2001 elektrisk sikkerhetsstandard. Likevel burde bli brukt det bare av skikkelig utdannede operatører. Les denne hele håndboken før bruking instrumentet og bruken bare gi til instruksjonene.
- Instrumentet må alltid bli brukt med jorden blyet av kraftkabelen som riktig ha blitt jordet til jord på hovedledningen utløp.
- Bruker bare uskadd elektrisk ledningsfremføring og utstyr som er spesifikk for spenningene du vil bruke. All utstyr koplet til høyspenning burde være i samsvar med EN61010-1:2001.
- Beholder instrumentet som tørker og rengjør som mulig. Visk regulært med et mykt, fuktig stoff. La instrumentet tørker komplett før bruk.
- Driver instrumentet i ekstrem fuktighet ikke (ovenfor 80%). Unngå kondensasjon ved å la enheten equilibrate til omgivelsestemperatur ved taen instrumentets fra et kaldere til et varmere miljø.
- Til å tillate tilstrekkelig kjølig, sikrer at ventilasjonsåpningene av instrumentet er ikke dekket.

Wazne Informacje – Polish

- Jeżeli ten sprzęt jest wykorzystywany w sposób nie określone przez Hoefer, Inc. do ochrony przewidzianej przez urządzenie może zostać obniżony.
- Instrument ten jest przeznaczony do użytku w laboratoriach kryty tylko.
- Tylko akcesoriów i części zatwierdzone lub dostarczone przez Hoefer, Inc. mogą być wykorzystane do eksploatacji, utrzymania i obsługi tego produktu.
- Uwaga! Ponieważ ten akt prawny może być rozwinięcie odpowiednich napięcie i bieżących do wyprodukowania śmiertelnego szoku, opiekę musi być wykonywane w działaniu.
- Ten instrument został zaprojektowany zgodnie z tym EN61010-1: 2001 Bezpieczeństwo elektryczne standard. Niemniej jednak, należy stosować jedynie przez odpowiednio przeszkoleni operatorów. Znajdą państwo to cały podręcznika przed zastosowaniem instrumentu i stosować jedynie zgodnie z instrukcjami.
- Instrument musi zawsze być wykorzystane z ziemi doprowadzić do zasilania detonującego właściwie uzasadnione na ziemię w sieci wodociągowej rynku zbytu.
- Wykorzystanie tylko nieuszkodzona elektrycznych drutów i urządzenia specjalne do napięć zapłacą wykorzystania. Wszystkie urządzenia podłączone do wysokiego napięcia powinny być zgodne z EN61010-1: 2001.
- Kontrolować instrumentu jako suche i czyste jak to możliwe. Wytrzeć regularnie przy pomocy miękkiego wilgotnej szmatki. Niech się instrumentem całkowicie wysuszyć przed użyciem.
- Nie prowadzą do instrumentu w skrajnych wilgotności (powyżej 80%). Zapobiec kondensacji najmu przez jednostkę równoważyć do temperatury pokojowej przy podejmowaniu instrumentu z chłodniejsze w cieplejszych środowiska.
- Aby umożliwić wystarczające chłodzenia, zapewniają, że rozcięcia of the instrument nie objęte ubezpieczeniem.

Informações Importantes – Portuguese

- Se este equipamento é usado numa maneira não especificada por Hoefer, Inc. que a protecção fornecida pelo equipamento pode ser comprometida.
- Este instrumento é projectado para uso de interior de laboratório só. Só acessórios e partes aprovaram ou forneceu por Hoefer, Inc. pode ser usada para operar, manter, e servicing este produto.
- Advertindo! Porque este instrumento pode desenvolver voltagem suficiente e corrente produzir um choque letal, cuidado deve ser exercitado em sua operação.
- Este instrumento é projectado de acordo com o EN61010-1:2001 condição de segurança eléctrica. Não obstante, deve ser usado só por operadores adequadamente treinados. Leia este manual inteiro antes de usar o instrumento e use só de acordo com as instrucções.
- O instrumento sempre deve ser usado com o chumbo de terra do cordão de poder corretamente baseou a

terra nos canos saída principais.

- Usa fio eléctrico só intacto e equipamento específico para as voltagens que você usará. Todo equipamento conectado a voltagem alta deve ser de acordo com EN61010-1:2001.
- Mantem o instrumento tão seco e limpo como possível. Limpe regularmente com um pano húmido macio. Deixe o instrumento secar completamente antes de uso.
- Não opera o instrumento em humidade extrema (acima de 80%). Evite condensação deixando o equilibrate de unidade a temperatura ambiental quando tomar o instrumento de um mais frio a um ambiente mais quente.
- Permitir esfriar suficiente, assegura que as aberturas do instrumento não são cobertas.

Información Importante – Spanish

- Si este equipo es utilizado en una manera no especificado por Hoefer, S.a. la protección proporcionado por el equipo puede ser dañada.
- Este instrumento es diseñado para el uso interior del laboratorio sólo. Sólo accesorios y partes aprobaron o suministraron por Hoefer, S.a. puede ser utilizado para operar, para mantener, y para atender a este producto.
- Advirtiendo! Porque este instrumento puede desarrollar voltaje y corriente suficientes para producir un golpe mortal, el cuidado debe ser ejercitado en su operación.
- Este instrumento es diseñado de acuerdo con el EN61010-1:2001 estándar eléctrico de seguridad. No obstante, debe ser utilizado sólo por operarios adecuadamente capacitados. Lea este manual entero antes de utilizar el instrumento y el uso sólo según las instrucciones.
- El instrumento siempre debe ser utilizado con el plomo de la tierra del cable de alimentación molió correctamente a la tierra en la salida de red.
- Utiliza alambre y equipo eléctricos sólo ilesos específicos para los voltajes que usted utilizará. Todo equipo conectado al voltaje alto debe ser de acuerdo con EN61010-1:2001.
- Mantiene el instrumento tan seco y limpio como posible. Enjugue regularmente con un suave, el trapo húmedo. Permita que el instrumento seque completamente antes de uso.
- No opera el instrumento en la humedad extrema (encima de 80%). Evite condensación permitiendo la unidad equilibra a la temperatura ambiente al tomar el instrumento de un más frío a un ambiente más tibio.
- Permitir refrigeración suficiente, asegure que las aberturas del

Viktig Information – Swedish

- om denna utrustning används i ett sätt som inte har specificeras av Hoefer, Inc. skyddet tillhandahöll vid utrustningen kan skadas.
- Detta instrument formges för inomhuslaboratorium användning bara.
- Bara medhjälpare och delar godkände eller levererade vid Hoefer, Inc. kan användas för fungera, underhålla, och servicing denna produkt.
- varna! Därför att detta instrument kan utveckla tillräcklig spänning och ström att producera en dödlig stöt, måste övas omsorg i dess funktion.
- Detta instrument formges i överensstämmelse med EN61010-1:2001 elektriska säkerheten standarden. Icke desto mindre, bör det användas bara av riktigt utbildade operatörer. Läs denna hela handbok före använda instrumentet och använd bara enligt undervisningarna.
- Instrumentet måste alltid användas med jorden blyet av kraften repet riktigt grounded till jorden på det huvudutloppet.
- Använder bara undamaged elektrisk tråd och utrustning specifik för spänningarna du ska använda. All utrustning kopplats som till hög spänning skulle vara i överensstämmelse med EN61010-1:2001.
- Håller instrumentet då torkar och rengör som möjlig. Torka regelbundet med en mjuk, fuktig trasa. Låt instrumentet torka fullständigt före användningen.
- Fungerar inte instrumentet i extrem fuktighet (över 80%). Undvik kondensering vid låta enheten equilibrate till omgivande temperatur när ta instrumentet från en kallare till en varmare miljö.
- Att tillåta tillräcklig kyla, ser till att hålen av instrumentet inte täcks.

Waste Electrical and Electronic Equipment (WEEE)

English

This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.

French

Ce symbole indique que les déchets relatifs à l'équipement électrique et électronique ne doivent pas être jetés comme les ordures ménagères non-triées et doivent être collectés séparément. Contactez un représentant agréé du fabricant pour obtenir des informations sur la mise au rebut de votre équipement.

German

Dieses Symbol kennzeichnet elektrische und elektronische Geräte, die nicht mit dem gewöhnlichen, unsortierten Hausmüll entsorgt werden dürfen, sondern separat behandelt werden müssen. Bitte nehmen Sie Kontakt mit einem autorisierten Beauftragten des Herstellers auf, um Informationen hinsichtlich der Entsorgung Ihres Gerätes zu erhalten.

Italian

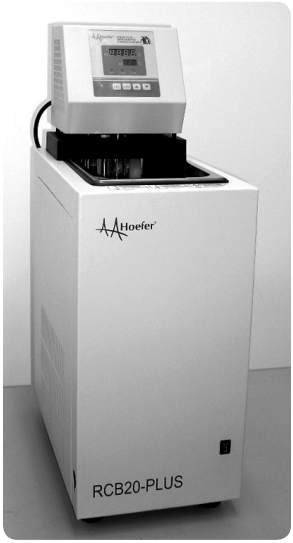
Questo simbolo indica che i rifiuti derivanti da apparecchiature elettriche ed elettroniche non devono essere smaltiti come rifiuti municipali indifferenziati e devono invece essere raccolti separatamente. Per informazioni relative alle modalità di smantellamento delle apparecchiature fuori uso, contattare un rappresentante autorizzato del fabbricante.

Spanish

Este símbolo indica que el equipo eléctrico y electrónico no debe tirarse con los desechos domésticos y debe tratarse por separado. Contacte con el representante local del fabricante para obtener más información sobre la forma de desechar el equipo.

Swedish

Denna symbol anger att elektriska och elektroniska utrustningar inte får avyttras som osorterat hushållsavfall och måste samlas in separat. Var god kontakta en auktoriserad tillverkarrepresentant för information angående avyttring av utrustningen.



Congratulations on choosing the Hoefer® RCB20-PLUS, Refrigerated and Heated Circulation Bath. You have made an excellent choice and we thank you for the trust that you have placed in us. This operating manual is designed to help you gain an understanding of the principles of operation and capabilities of the circulator. To ensure optimal performance, we recommend that you study this manual prior to beginning operation.

1. Unpacking and Initial Inspection

Unpack and inspect the circulator and accessories upon receipt. Report any damage to the responsible carrier. The carrier will provide the form required for filing such a claim. To report missing items, or for questions regarding the instrument's use, contact Hoefer, Inc.

Hoefer, Inc.
84 October Hill Road
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Email: support@hoeferinc.com

2. Description

The Hoefer RCB20-PLUS is designed for cooling or heating items using specific fluids in a bath tank.

Features:

- Water bath temperature control from -10 °C to 110 °C .
- Ability to change bath temperature during use.
- Maximum water bath temperature alarm control adjustment.
- Allowable temperature variation alarm control adjustment.
- The RCB20-PLUS is equipped with pump fittings to provide the option of utilizing the unit heating, circulation, and cooling functions to connect to a water bath or device external to the unit. Tubing is connected to a barbed inlet and output connectors to circulate temperature controlled liquid to the external bath or device.
- Hoefer water baths are operated by using the splash-proof keypad. Microprocessor technology allows you to set and store the set point indicated on the LED temperature display. The PID temperature control adapts the heat supplied to the thermal requirements of the bath.
- The circulator contains an excess temperature protection safety feature, independent of the control circuit, which conforms to IEC 61010-2-010.
- Alarm protection for:
  a. Main unit circulator and heater overheating.
  b. Low water level (adjustable).
  c. Open circuit.
- The RCB20-PLUS conforms to the relevant requirements specified by European guidelines.

3. Safety Recommendations

Note: Follow all safety recommendations contained in this instruction manual to prevent damage to persons or property.

Installation, operation, and maintenance of the RCB20-PLUS must be carried out according to standard laboratory safety guidelines. All individuals operating the RCB20-PLUS should read and understand the safety information and operating instructions that follow. It is the customer's responsibility to ensure that operators are fully informed about the hazards involved with their job functions as well as preventative measures.

- Make sure you read and understand all instructions and safety precautions listed in this manual before installing or operating your unit.
- Only connect the unit to a grounded mains power socket.
- Use non-flammable liquids only.
- Place the instrument on an even surface on a pad made of non-flammable material.
- Never operate the unit without liquid in the bath.
- Exercise caution when emptying hot bath fluids! Check the temperature of the bath fluid prior to draining by switching the unit on for a short moment and reading the LED.
- Only use suitable connecting tubing and make sure that the tubing is securely attached.
- Never operate damaged or leaking equipment.
- Always turn off the unit and disconnect the mains cable from the power source before performing any service or maintenance procedures, or before moving the unit.
- Always empty the bath before moving the unit.
- Never operate equipment with damaged mains power cables.
- Some parts of the bath cover and the pump connections may become extremely warm during continuous operation. Therefore, exercise particular caution when touching these parts.
- Do not block ventilation openings on the instrument to reduce risk of overheating.

To avoid fire potential:

- Do not use any liquid with an alcohol concentration over 40% to fill the water bath.
- Do not use any solution in the water bath that has a low flash point.

3.1 Handling

- This unit is designed for operation in a controlled electromagnetic environment. This means that transmitting devices (e.g., cellular phones) should not be used in the immediate vicinity.
- Magnetic radiation may influence other units with components susceptible to magnetic fields (for example, a monitor). We recommend a minimum distance of 1 m.
- Avoid vibration, impacts to the housing, damage to the keypad foil (keys, display), and chemical contamination.
- Ensure that the RCB20-PLUS is regularly inspected. Regularly check the condition of the mandatory warning, prohibition and safety labels.
- Take care that the mains supply is adequate to avoid any impact from other systems being operated on the same main.
- Do not store the unit in an aggressive atmosphere (e.g., high humidity, chemical atmosphere, marine or other corrosive environments).
- Permissible ambient temperature: maximum 35 °C, minimum 5 °C.
- Permissible relative air humidity: 90%
- The instrument thermostat should be re-calibrated every year, and after replacement of the temperature sensor.

If you have any questions concerning the operation of your unit or the information in this manual, please contact us.

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3.2 Disposal

- Use only recommended bath fluids and non-acid materials. Never fill the bath with flammable materials as this constitutes a fire hazard.
- Care and attention are required when using the RCB20-PLUS because of the wide temperature operating range. Avoid thermal hazards: burning or scalding may result from hot steam or hot parts and surfaces.
- Observe the specific instructions for other instruments that you connect to the circulator, particularly the respective safety recommendations.
- Also observe the pin assignment of plugs and technical specifications of the products.

Caution! Hoefer assumes no liability for use of bath fluids other than those recommended. Ethylene glycol has a low toxicity. Strictly observe the safety data and handling instructions from the ethylene glycol manufacturer.

Do not use flammable bath fluids.

Danger of freezing: Do not use water for working temperatures under 5 °C.

3.3 Safety Precautions

Please contact Hoefer before using bath fluids other than those recommended. Some examples of unsuitable fluids are liquids which are very highly viscous (higher than 30 mm^2/s at the respective working temperature), liquids with corrosive characteristics, and liquids that tend to cause cracking.

- The outer cover of the unit will become hot when water bath temperature is ≥50 °C. Use caution when touching all parts of the unit at this temperature.
- If you are using the RCB20-PLUS for temperature control of test tubes, Erlenmeyer flasks, or similar objects placed directly within the circulator, take careful note of what is contained within these vessels.
- Before starting to work, obtain information concerning the substance to be heated or cooled. Note whether toxic steams or gases arise when heating, and whether an exhaust is needed when working. Determine the method for decontamination should it become necessary.
- Hoefer assumes no liability for use of substances that are flammable, hazardous to health, environmentally unsafe, or dangerous in any way.
- There is an excess temperature control for the RCB20-PLUS hardware that can be adjusted using a screwdriver, (see Fig 1, page 10).

3.4 Warranty Conditions

Hoefer warrants its products against defects in material or in workmanship, when used under appropriate conditions and in accordance with appropriate operating instructions for a period of 12 months from the date of purchase. Hoefer's sole obligation shall be to repair or to replace at Hoefer's option, F.O.B. its plant or locally, without charge, any part(s) that prove defective within the warranty period, providing the customer notifies Hoefer promptly and in writing of any such defect. Compensation for labor other than Hoefer's employees will not be Hoefer's obligation. Part(s) replacement does not constitute an extension of the original warranty period.

Hoefer will not assume responsibility for unauthorized product modifications, or for repairs, replacements, or modifications negligently or otherwise improperly made or performed by persons other than Hoefer employees or authorized representatives.

HOEFER MAKES NO WARRANTY OR MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, AS TO THE DESIGN, SALE, INSTALLATION, OR USE OF ITS PRODUCTS, AND SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF ITS PRODUCTS.

4. Technical Specifications

The right to technical changes without prior notification is reserved.

Safety installations according to IEC 61010-2-010:

- Excess temperature protection adjustable from 50 – 110 °C.
- Classification according to DIN 12876-1 class I.
- Alarm indication: optical + audible (permanent).

Working temperature range	-10 °C – 110 °C
Temperature stability	±0.03 °C
Temperature selection	Digital
Temperature indicator	LED display
Ambient temperature range	5 – 35 °C
Ambient relative humidity	90%
Heating power	750 W
Cooling power	150 W
Nominal power of compressor	135 W
Refrigerant	R134a
Temperature raising time	≤45 min (Raising from 20 °C to 95 °C)
Temperature lowering time	≤90 min (Lowering from 20 °C to -10 °C)
Input power source	AC220 – 240V 50/60Hz AC100 – 120V 50/60Hz
Input power	1200 W
Insulation resistance	≥1.5 MΩ
Dimension of work area of water bath	150 × 140 × 140 mm (L × W × H)
Dimensions of inner tube of water bath	300 × 150 × 160 mm (L × W × H)
Outside dimensions	400 × 230 × 660 mm (L × W × H)
Size of input and output luer connectors for tubing	12 mm
Net weight	25 kg
Bath capacity	4 – 6 L

Environmental conditions according to EN 61010, part 1:

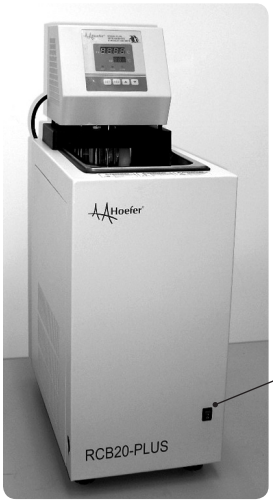
- Use only indoors.
- Altitude up to 2000 m – normal zero.
- Ambient temperature: +5 to +35 °C (for storage and transportation)
- Air humidity: Maximum relative humidity 90% for temperatures up to +35 °C
- Protection class according to EN 60 529 IP21

Power supply according to class 1, VDE 0106 T1:

- Not for use in explosive atmosphere.
- Maximum mains fluctuation of ±10% is permissible.
- Over voltage category: II
- Pollution degree: 2
- Standards for interference resistance EN 61326: 1997 + A1: 1998 + A2: 2001
- Emitted interferences: The unit adheres to the threshold values for emitted interferences according to table 3 of EN 61326.
- Interference resistance: The unit conforms to the requirements according to table B1 of EN 61326.

5. Operating Controls and Functional Elements

Figure 1. RCB20-PLUS front and rear views.



Refrigeration unit power switch

Controller power switch

Circulator excess temperature control

Main power cord plug

Water bath outlet tube collar nut

Water bath inlet tube collar nut

Refrigeration system power cord plug

Figure 2. Operating Controls and Function Keys – Detail

1. Measured Bath Temperature LED Display
2. Set Bath Temperature LED Display
3. Heating Control Indicator
4. Water Level Indicator
5. Alarm Indicator
6. Set Key (enter)
7. Temperature change control
8. Edit Keys
   (increase or decrease temperature setting)

6. Preparation

6.1 Installation

Note: Do not set up the unit near heat sources and do not expose to sunlight.

❶

Place the unit in an upright position, keeping at least 20 cm of open space before the front and rear venting grids.

❷

To ensure maximum cooling performance of the compressor, wait about one hour after transporting and setting up before operating. This will allow any oil that has accumulated laterally during transport to flow back down in the motor.

6.2 Filling

Note: Strictly observe the safety precautions described on the following page.

❶

Use only recommended bath fluids:

Temperature range	Recommended bath fluid
+5 to +90 °C	Deionized water
+30 to +50 °C	1:1 Mixture of water and ethylene glycol

Note: Do not use a mixture of more than 40% alcohol for the bath fluid.

❷

Fill the internal bath no higher than 30 mm below the tank rim.

❸

To prevent excessive liquid loss due to evaporation keep the cover over filled bath except as necessary to immerse samples.

Caution! At high working temperatures, the tubing used to connect the circulating bath to heated external devices can represent a danger source. Damaged tubing lines may cause hot bath fluid to be pumped out within a short time, which could result in burns.

6.3 To Connect Water Bath to Tubing for Cooling or Heating External Devices

❶

Locate the two collar nuts on the back of the unit between the smaller main control unit and the larger refrigeration unit, (see Fig 1, page 10).

❷

Unscrew the collar nuts from the pump connectors for inlet and output flow barbed fittings.

❸

Screw the metal barbed fittings into the pump connectors.

❹

Attach the tubing onto the barbed fittings and secure with ties or tubing clamps.

❺

Turn on both the main control switch and the refrigeration unit switch to begin circulation.

❻

Adjust the flow using the Flow Adjustment Valve, (Fig 3, following page).

❼

Observe the following safety precautions with regards to tubing:

a. Employ suitable connecting tubing.

b. Make sure that the tubing is securely attached.

c. Avoid sharp bends in the tubing, and maintain sufficient distance from surrounding walls.

d. Regularly check the tubing for material defects and cracks.

e. Replace the tubing at regular intervals to prevent cracking and leaks.

6.4 Adjusting the Pump Flow

The pump flow is pre-adjusted in the factory and should be correct for most RCB20-PLUS uses. If it does need changing it can be adjusted as follows:

❶

Locate the Flow Adjustment Valve inside of the water bath next to the heating element.

❷

Turn the Flow Adjustment Valve counterclockwise up to 360° to obtain the desired flow pressure, (Fig 3).

Figure 3.
Flow Adjustment Valve.

Caution! Hoefer, Inc. disclaims all liability for damage caused by incorrect line voltages.

Note: The refrigeration unit and main control unit each have separate power cords, both units must be plugged into a grounded external power source to operate the water bath.

7. Operating Instructions

7.1 Power Connection

❶

Ensure that the line voltage matches the supply voltage specified on the identification plate. Deviations of ±10% are permissible.

❷

Connect the unit to a grounded mains power socket only.

❸

To turn unit off: both units must be turned off using the main power switches on each unit.

7.2 Filling the Water Bath

Fill the water bath with an approved liquid until 30 mm below the top of the bath. If the operating temperature is below 4 °C, the refrigerant should be a 1:1 mixture of water and ethylene glycol. If the operating temperature is between 95 °C and 100 °C, the refrigerant should be bath fluid with a boiling point over 100 °C.

7.3 Operation

Switch on the mains power of the controller and the refrigerator. The set temperature should be 5 °C below room temperature when turning on the refrigerator.

During startup the RCB20-PLUS conducts a self-diagnosis inspection. Upon successful completion of the self inspection the unit will start operating at the set parameters. If the unit fails the self-inspection and alarm will sound.

7.4 Setting the Desired Water Bath Temperature

❶

Press and release the SET key. The end digit of the "SV" LED window will start flashing.

❷

Press the ▲ or ▼ keys until the desired value is reached in the "SV" LED window.

❸

Wait 8 seconds for the "SV" digit to stop flashing and the desired temperature is set.

7.5 Setting the Temperature Variation Limit

❶

Press and release the SET + ▲ key simultaneously. The end digit in the “SV” window will start flashing.

❷

Press the ▲ or ▼ keys until the desired value is reached in the “SV” LED window.

❸

Wait 8 seconds for the “SV” digit to stop flashing and the temperature variation limit is set.

7.6 Setting Upper Temperature Limit

❶

Press and release the SET + ▼ key simultaneously. The end digit in the “PV” window will start flashing.

❷

Press the ▲ key until the desired value is reached in the “PV” LED window. If necessary move the cursor to the next digit, by pressing the SET key alone. Use the ▲ or ▼ keys to select the second digit.

❸

Repeat as described above as necessary until the desired temperature is selected.

❹

Wait 8 seconds for the “SV” digits to stop flashing and upper temperature limit is set.

7.7 Changing the Working Temperature Adjustment During Use

❶

Press the ADJ key. The end digit in the “SV” temperature setting window will start flashing.

❷

Press the ▲ or ▼ key until the desired number is reached.

❸

Move the curser to the next digit, by pressing the ADJ key again.

❹

Press the ▲ or ▼ key until the desired number is reached.

❺

Repeat as necessary.

❻

Wait 8 seconds for the “SV” digits to stop flashing and that value is set.

Figure 4. Drain hose.

Caution! Take care when emptying hot bath fluids. Store and dispose of used bath liquid according to laws for environmental protection.

7.8 Draining the Water Bath

Method 1: Use the external circulation outlet nozzle to pump out liquid.

❶

Turn off the main unit and refrigeration system.

❷

Locate the two collar nuts on the back of the unit between the smaller main control unit and the lower refrigeration unit.

❸

Unscrew the collar nut from the outlet connector (see rear view photo page 10). Screw in barbed tubing connector. Place the end of Tygon type tubing over the barbed fitting.

❹

Secure the tubing with a tie.

❺

Turn pump power on using main power switch.

❻

Allow pump to run until bath is drained.

Method 2: Use the drain hose located on the side of the unit.

❶

Locate the drain hose on the side of the unit, (Fig 4).

❷

Pull the hose free of the RCB20-PLUS case and unscrew the end cap, place end near drain.

❸

Turn pump power on using main power switch.

❹

Allow pump to run until bath is drained.

Setting Temperature Parameters

The following temperature parameters can be controlled with the RCB20-PLUS:

- Temperature Variation Limit
- Upper Temperature Limit
- Water Bath Temperature

Table 1. Parameters and Controls for RCB20-PLUS

Parameter controlled	Limits	Function	Key sequence to enter "Set" mode
Temperature Variation Limit	3 – 9 °C	This setting allows you to determine the amount of variation allowed in the water bath temperature before an alarm is triggered. For example when set to 3 °C, the temperature alarm will trigger if the water bath temperature becomes 3 °C above or below the desired water bath temperature.	SET + ▲ (simultaneously)
Upper Temperature Limit	50 – 110 °C	Triggers an alarm when the water bath temperature reaches the setting.	SET + ▼ (simultaneously)
Set Water Bath Temperature	-10 to +110 °C	Sets the desired internal or external water bath temperature.	SET
Change Water Bath Temperature		Change the water bath temperature while in use.	ADJ

Table 2. Refrigeration System Temperature Control Limitations

Water bath temperature setting	Refrigeration system function
≤25 °C	Refrigeration system will cool.
25 – 30 °C	The refrigeration system will remain powered but will not cool.
≥30 °C	The refrigeration system powers will automatically shut off. Once this happens, the user will not be able to turn the refrigeration unit back on for 3 minutes.

Note: This table assumes the unit is being used at room temperature, 20 °C. If using the water bath in a cold room, 16 °C should be subtracted from the water bath temperature settings.

8. Safety Features / Troubleshooting

8.1 Protection

Protection of Compressor

The compressor has a built-in over-pressure protector and over-current protector. Power to the compressor will be stopped if excessive water pressure or current is detected.

Low / No Water Protection

The heating element will stop heating if the temperature becomes too high as a result of low water level.

Over-Current Protection

The RCB20-PLUS is protected with a fuse in case of electronic failure. If the fuse does trip, the unit should be evaluated and the cause determined prior to installing a new fuse, and powering the unit.

8.2 Alarms

Temperature Sensor Open-Circuit Alarm

If the temperature sensor (PT100) detects an open-circuit, an alarm will sound, the visible “alarm” light will display and power will shut off.

Temperature Sensor Short-Circuit Alarm

If the temperature sensor (PT100) detects a circuit short, an alarm will sound, the visible “alarm” light will display and power will shut off.

Low Liquid Level Alarm

If the liquid level is low, an alarm will sound but the unit will continue running.

Over-Temperature Alarm

When the bath solution temperature exceeds the set temperature by 10 °C an alarm will sound and the visible “alarm” display will light.

Important! Before cleaning the unit, disconnect the power plug from the mains socket. Take care to prevent water from spilling into the interior of the circulator.

Important! The tank should be filled only with a bath fluid recommended by Hoefer.

To avoid contamination, change the bath fluid at least once a month.

9. Cleaning the Unit

- To clean the bath tank and the immersed parts of the circulator, use low surface tension water (liquid detergent in water).
- Clean the outside of the unit using a wet cloth and distilled water.

10. Returns and Repairs

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Contact Hoefer, Inc.

If you have questions or problems operating the unit or to request repair and return authorization, contact your local supplier or contact Hoefer directly.

Return Shipping Instructions

- Call a Hoefer service representative for a return order number (RMA# and return shipping address) and "Health and Safety Declaration" form before returning any Hoefer instrument.
- All units must be CLEAN before they are packed. This means that all items returned must be free of fluids and debris. The exterior of the tanks and controllers are expected to be wiped down and free of foreign substances. Unknown materials in or on units are treated as hazardous materials and handled accordingly. Failure of the sender to clean and remove foreign matter could result in additional labor and/or hazardous disposal charges associated with cleaning the unit.
- Include a letter with the shipment indicating the reason for the return.
- The unit must be sent via a trucking company in an upright position and on a pallet. Boxes should be labeled marking the orientation ("This End Up").

Note: Shipping peanuts are NOT acceptable padding.

- Pack the unit with a minimum of 2 inches of firm padding on all sides to prevent shipping damage.
- The original packing is acceptable if undamaged.
- Write the Return Order (RMA) Number on the outside of the box in large numbers.
- Insure the unit for the price paid. If you are unsure of the value to insure, contact Hoefer. If an underinsured package is damaged in shipment, the sender is responsible for all costs that exceed the insured value.

11. Ordering Information

Description	Catalog Number
Refrigerated and Heating Circulator, 100–115 Volt	RCB20-PLUS-115V
Refrigerated and Heating Circulator, 230 Volt	RBC20-PLUS-230V
Tubing Kit Includes: 2 sets of QuickFit connectors and 2 × 3 foot lengths of Tygon tubing (3/8" ID)	RCB21

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